DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention

Memorandum

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Subject: Foodborne illness from *Salmonella* and *Campylobacter* associated with poultry, United States

To: The Record

Salmonella and *Campylobacter* are two of the most common foodborne pathogens that produce illness in humans, causing an estimated >1 million and >800,000 illnesses, respectively, due to food consumed in the United States. Most of these estimated illnesses are not confirmed by culture. Exposure to poultry meat is an important risk factor for illness from both pathogens. Evidence for this link has come from investigation of both outbreak and sporadic (non-outbreak) cases of human illness.

Outbreaks of foodborne illness, when successfully investigated, can yield detailed information about the food (e.g., eggs, poultry, other) causing the outbreak. Outbreak data, therefore, provide important evidence linking sources of *Salmonella* and *Campylobacter* to human illness. CDC collects outbreak data reported by state and local health departments through the Foodborne Disease Outbreak Surveillance System (FDOSS).

Although food sources of individual cases of sporadic foodborne illness are usually not identifiable, epidemiologic studies such as case-control studies can provide reliable scientific evidence about the role of specific foods as risk factors for these illnesses for the population as a whole. CDC collects data on laboratory-confirmed cases through the Foodborne Diseases Active Surveillance Network (FoodNet), an active, population-based, sentinel surveillance system for the United States. Several FoodNet case-control studies have examined the link between chicken and human infection with *Salmonella* or *Campylobacter*.

Salmonella

Salmonella accounted for 1335 foodborne outbreaks and 36,490 associated illnesses in outbreaks reported to FDOSS from 1999–2008.* A single food source was reported in 468 (35%) outbreaks; 137 (29%) were reported to be due to poultry and 97 (71%) of those were due to chicken. Poultry accounted for a higher percentage of outbreaks of *Salmonella* infection than any other food commodity.

Most reported cases of *Salmonella* infection are sporadic; sporadic cases outnumber outbreak-associated cases by more than 15 to 1. The two most commonly reported *Salmonella* serotypes are Enteritidis and Typhimurium, which account for about 35% of infections in which the serotype is known. Both serotypes have consistently been linked with exposure to poultry in FoodNet case-control studies. Chicken was demonstrated to be a risk factor for serotype Enteritidis infection in a study conducted during 1996–1997, in which persons who reported eating chicken outside of the home had three times higher odds of being diagnosed with serotype Enteritidis infection than those who did not. In the same study, ill persons who reported eating turkey cooked at home had four times higher odds of being infected with a strain of *Salmonella* serotype Typhimurium that was resistant to antimicrobial agents than with a strain of *Salmonella* serotype Typhimurium that was not resistant. In a separate FoodNet study conducted during 2002–2003, eating chicken outside of the home accounted for a higher percentage (36%) of domestically-acquired cases of *Salmonella* serotype Enteritidis infection than any other exposure studied.

Exposure to poultry meat has also been linked to *Salmonella* illness. In a FoodNet case-control study of infants conducted during 2002–2004, those who rode in a shopping cart next to raw meat or poultry had three times higher odds of being diagnosed with *Salmonella* infection than those who did not. For the youngest infants (<3 months of age), the odds were 6 times higher. Over 11% of all cases of *Salmonella* infection in infants were attributed to this risk factor, more than the proportion attributed to consumption of meat or partially cooked eggs combined (10%). Studies conducted in the United Kingdom have found the outside of some packages of meat and poultry to be contaminated with pathogens, including *Salmonella*.

Campylobacter

Campylobacter accounted for 208 foodborne outbreaks and 5077 associated illnesses in outbreaks reported to FDOSS from 1999–2008.* A single food source was reported in 104 (50%) outbreaks; 22 (21%) were due to poultry and 19 (86%) of those were due to chicken. Poultry was second only to dairy products as a food commodity causing outbreaks of *Campylobacter* infection.

Nearly all reported cases of *Campylobacter* infection are sporadic; sporadic cases outnumber outbreak-associated cases by more than 400 to 1. Many studies have linked *Campylobacter* infection to poultry. For example, a FoodNet case-control study conducted during 1998–1999 found that persons who reported eating turkey or chicken outside the

home in the seven days before the case's illness had two to three times higher odds of becoming ill with *Campylobacter* than those who did not. Of the many food and environmental exposures examined, eating chicken outside the home accounted for the largest percentage of *Campylobacter* cases (24%).

Exposure to poultry meat has also been linked to *Campylobacter* infection. In the FoodNet case-control study of infants conducted during 2002–2004, those 0–6 months of age who rode in a shopping cart next to raw meat or poultry had 6 times higher odds of being diagnosed with *Campylobacter* infection than those who did not.

Conclusion

Poultry products are an important vehicle for human *Salmonella* and *Campylobacter* infections in the United States.

*FDOSS database accessed on July 1, 2010